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Physics of Defects

Proceedings of Les Houches Summer School,
Session XXXV, 28 July - 29 August 1980

edited by ROGER BALIAN, *Centre d'Etudes Nucléaires de Saclay, Gif-sur-Yvette, France,* MAURICE KLÉMAN, *Université Paris-Sud, Orsay, Cedex, France and* JEAN-PAUL POIRIER, *Université Pierre et Marie Curie, Paris Cedex, France*

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The physics of defects has long been practically ignored by a wide majority of physicists, although it has been the favourite domain of metallurgists. In the meantime, the notion of defect has appeared to be very useful, and in fact essential, in other domains like superfluidity (where a quantized vortex line is akin to a rotational dislocation), superconductivity, and liquid crystals. The time has come when the generality of the geometrical approach to defects is recognized while their physical role is more and more actively studied in materials other than metals. The concept has also proved interesting and might be useful, either by its geometrical content or by its energetical (physical) content, in research fields. Recently the study of some new types of ordered media, like amorphous materials, spinglasses, incommensurate phases, have taken advantage of the concepts of the physics of defects.

Faced with this conjunction of new interests in a physics which is both unifying and changing quite rapidly, the time seemed ripe to organize this session, bringing together scientists from various horizons of physics, of mathematics, biology or geophysics for the purpose of cross-fertilization of ideas. The published results of this meeting concentrate on the rich diversity of the physics of defects emphasizing its interdisciplinary aspects. In this volume, the various contributions to the session are presented in a didactical order.

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